

SPECIFIC GUIDANCE NOTE ON VENTILATION AND INDOOR AIR QUALITY (IAQ) DURING COVID-19 PANDEMIC



DEPARTMENT OF OCCUPATIONAL
SAFETY AND HEALTH

SETTING



GUIDANCE NOTE ON
VENTILATION &
INDOOR AIR QUALITY
FOR RESIDENTIAL
SETTING DURING
COVID-19 PANDEMIC



GUIDANCE NOTE ON
VENTILATION & INDOOR
AIR QUALITY FOR
NON-RESIDENTIAL SETTINGS
DURING COVID-19 PANDEMIC



GUIDANCE NOTE ON
VENTILATION AND INDOOR
AIR QUALITY (IAQ) FOR
PUBLIC AREA SETTING
DURING COVID-19 PANDEMIC



GUIDANCE NOTE TO BUILDING
OWNERS AND BUILDING
MANAGEMENTS ON VENTILATION
AND INDOOR AIR QUALITY (IAQ)
FOR **HEALTHCARE FACILITIES**
SETTING DURING COVID-19
PANDEMIC





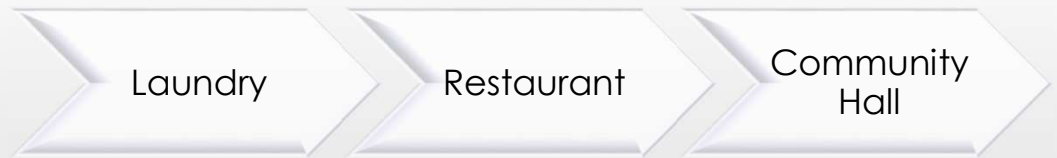
GUIDANCE NOTE ON VENTILATION & INDOOR AIR QUALITY FOR RESIDENTIAL SETTING DURING COVID-19 PANDEMIC



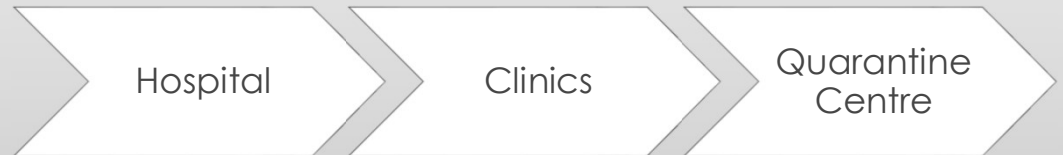
GUIDANCE NOTE ON VENTILATION & INDOOR AIR QUALITY FOR NON-RESIDENTIAL SETTINGS DURING COVID-19 PANDEMIC



GUIDANCE NOTE ON VENTILATION AND INDOOR AIR QUALITY (IAQ) FOR PUBLIC AREA SETTING DURING COVID-19 PANDEMIC



GUIDANCE NOTE TO BUILDING OWNERS AND BUILDING MANagements ON VENTILATION AND INDOOR AIR QUALITY (IAQ) FOR HEALTHCARE FACILITIES SETTING DURING COVID-19 PANDEMIC



GENERAL PRINCIPLES

Ensuring proper ventilation with outside air can help reduce indoor airborne contaminants

Increasing ventilation by itself is not enough - should be done simultaneously with Standard Operating Procedures (SOPs) recommended by MOH/ NSC & other key measures to reduce disease transmission, such as requiring building occupants to practice physical distancing, wearing masks, frequently washing hand, and carrying out regular disinfection of high-touch points within the building

It is of importance that a risk assessment be carried out to facilitate the implementation of relevant countermeasures and to assess the minimum ventilation rate per person

GENERAL PRINCIPLES

If it is not possible to improve the ventilation, then action must be taken to adjust the maximum building occupancy

Work practices designed to reduce crowding or occupancy such as telework, staggered schedules and remote/video meetings

Limiting the use of small spaces that are shared, such as laundry rooms, and lobbies.

GENERAL PRINCIPLES

Regular surface cleaning according to the details in Annex 36 of 'Garis panduan Pengurusan COVID-19: Garispanduan Pembersihan dan Disinfeksi di Tempat Awam' issued by MOH should be carried out in addition to ventilation improvements.

- Industry Code of Practice (ICOP) on Indoor Air Quality 2010 published by Department of Occupational Safety and Health (DOSH)
- Other established documents published by respective international organization and other countries on ventilation and indoor air quality during COVID-19 pandemic

SCOPE



NATURAL
VENTILATION
FACILITIES

AIR-CONDITIONED
FACILITIES
WITHOUT
FRESH AIR SUPPLY

AIR-
CONDITIONED
FACILITIES WITH
MECHANICAL
VENTILATION

GENERAL CONCEPT- AIR CONDITIONED WITH MECHANICAL VENTILATION

Ensure all components and controls of the MVAC system are maintained and functioning as per design

Advisable to increase outdoor fresh air ventilation by opening outdoor air dampers 100% in order to increase effective dilution ventilation per person.
Recommended value: 10 l/s per person

Inspect daily for MVAC components for continuous operation

Filtration: Consider using Filters of MERV 13 or higher MERV value filters. Using this higher MERV filters shall take into consideration the capabilities of the MVAC systems. Consider MERV14/F8 for Healthcare setting.

GENERAL CONCEPT- AIR CONDITIONED WITH MECHANICAL VENTILATION

Water
Systems –
ASHRAE
Standard
188-2018/
ASHRAE
Guidelines
12-2020

Reduce
occupant
density in
air-
conditioned
spaces

Consider air
flushing/
purging
before and
after
occupancy
of the
buildings

GENERAL CONCEPT- AIR CONDITIONED WITH MECHANICAL VENTILATION

Maintain Temperature parameter in the range 23°C – 26°C and
Relative Humidity parameter in the range of 40% - 70%

Disable Demand
Control Ventilation
(DCV) where
necessary

Consider using
sterilization /inhibition/
deactivation systems -
which may be
considered for added
effectiveness (with
professional
consultation/advice;
study; trained operator).
Efficacy and safety of
under the operating
conditions must be
considered


Ensure the filters are
installed correctly and
well-sealed according
to manufacturers'
recommendation

GENERAL CONCEPT- AIR CONDITIONED WITH MECHANICAL VENTILATION

All supply air diffusers should operate at designated airflow direction

Ensure all outdoor air reach all intended place by doing balancing of air distribution system

Modify airflow direction by relocating supply and return air devices if necessary



GENERAL CONCEPT- AIR CONDITIONED WITH MECHANICAL VENTILATION

Stand-alone or portable air cleaners with appropriate filter may be used where there is evidence of their effectiveness. The stand-alone air cleaners do not replace ventilation in any circumstance

Install additional supply and/ or exhaust fans if the existing system does not deliver the sufficient outdoor air

Ensure there are no leakage of air into any occupied space including water seals, cracks in any pipes or ducts and wall gaps



GENERAL CONCEPT- AIR CONDITIONED FACILITIES WITHOUT FRESH AIR SUPPLY

Increase room ventilation rate

- As frequent as possible, open windows and doors to allow cross natural ventilation and to let fresh air into the space, unless outdoor air quality is poor or weather does not permit.
- When windows and doors are open, usage of the air conditioning system should be kept at a minimum or turned off completely
- Existing exhaust fans in places like toilets or kitchen, should be operated at maximum capacity.
- Installing an additional mechanical ventilation system which comprises of fresh air supply and/or stale air exhaust is highly recommended

GENERAL CONCEPT- AIR CONDITIONED FACILITIES WITHOUT FRESH AIR SUPPLY

Use of portable air cleaners may be considered as an additional measure to filter and clean indoor air. Measured space ventilation rate shall be higher than minimum recommended ventilation rate of the space (10 l/s per person)/ recommended CADR

Usage of portable air cleaner should not be the only measure taken for improving indoor air quality. Sufficient air ventilation is extremely crucial in maintaining good indoor air quality. The stand-alone air cleaners do not replace ventilation in any circumstance

Sanitary pipe water seals should be checked regularly to avoid air leakage from the sanitary system into occupied space. Cracks in ducts, sanitary pipes and shared walls should also be rectified.

GENERAL CONCEPT- AIR CONDITIONED FACILITIES WITHOUT FRESH AIR SUPPLY

Healthcare Facilities

Consider positioning extractor/mounted exhaust fans at windows to blow air outwards and increase air exchange

Consider adding dedicated outdoor air supply and/or exhaust. The outdoor air system can be designed such that high-efficiency (MERV14 or F8) filters when necessary

Modifying the position of the split unit or FCUs to direct the airflow to the less clean zone or install an extractor to control the airflow where Aerosol Generating Procedures (AGP) are performed



GENERAL CONCEPT- NATURAL VENTILATION FACILITIES

Do not close windows or doors when people are occupying the area. Closing windows or doors will result in a low level of ventilation. However, do not open windows or doors if the weather condition does not allow it; or there is poor surrounding air quality; or the condition poses a safety and health risk to people inside.

Depends on outdoor conditions (wind & temperature)

Existing exhaust fans in places like toilets or kitchen, should be operated at maximum capacity

Purge the area as frequently as possible by opening all doors and windows completely especially when the area is not occupied



GENERAL CONCEPT- NATURAL VENTILATION FACILITIES

Using fans (combination with other measures)

- Face the fan toward the windows or doors to blow air out; or away from the windows or doors to blow air into the area.
- Multiple fans can be used to push air out of one window or door and draw it in from another.
- For the use of a single fan, face it in the same direction the air is naturally moving.
- Observe the direction of the air as it may change at times (simple way to determine the direction by spot the movement of fabric/ curtain or by holding the light paper/ fabric).
- It may not be necessary to use a fan on windy days

GENERAL CONCEPT- NATURAL VENTILATION FACILITIES

Cross ventilation may be carried out by opening windows or doors at opposite sides of the area and keeping the internal doors open

Cross ventilation should not be implemented in a room or ward for COVID-19 suspected cases where AGP may take place and when the exhaust air is not properly managed and when the airflow is moving from a less clean to a clean area

Do not direct the airflow of the fan directly from one person to another person as it can increase the risk of possible airborne transmission

GENERAL CONCEPT- NATURAL VENTILATION FACILITIES

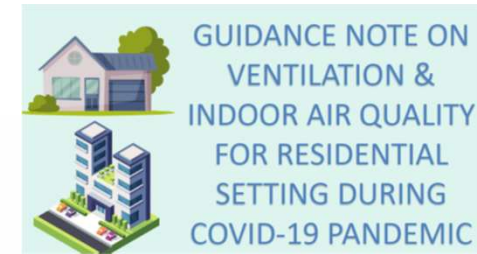
Consider reducing the maximum room occupancy

Consider to use a stand-alone air cleaner with appropriate filters if no other (short-term) strategy can be adopted. The stand-alone air cleaners do not replace ventilation in any circumstance

Window mounted exhaust fans can be considered for installation to enhance air ventilation in a poorly ventilated space

ADDITIONAL INFO - RESIDENTIAL SETTING

ENCLOSED AIR CONDITIONED RESIDENTIAL SETTINGS WITHOUT MECHANICAL VENTILATION PROVISION



GENERAL GUIDANCE

1

- To reduce or remove the sources of pollutants and to ventilate room spaces with clean outdoor air

2

- Electric fans such as ceiling fans or other fans available should be used to increase room air motion to enhance thermal comfort. Such improved air movement will reduce the over reliance on the use of air-conditioners.

3

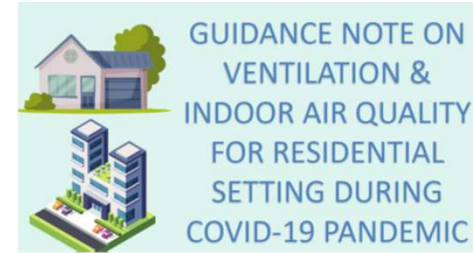
- There may be concern in opening windows and doors due to mosquitoes and insects. Mesh screens can be fitted to address such concern

4

- Operate exhaust fans in bathrooms and toilets whenever they are being used.
- Toilet lids should normally remain closed, especially prior to flushing.
- If possible, exhaust fan should be operated intermittently when toilet is not in use.

ADDITIONAL INFO - RESIDENTIAL SETTING

ENCLOSED AIR CONDITIONED RESIDENTIAL SETTINGS WITHOUT MECHANICAL VENTILATION PROVISION



USE OF SPLIT UNIT AIR CONDITIONERS

1

- Common in Malaysia, may give a false sense of freshness as they do not have ventilation provisions and their filtration systems are inadequate to filter or inactivate airborne virus particles

2

- When air-conditioners are not being used, open as many windows and doors, where practical, as possible to ventilate your dwellings, especially in the morning and evening when outdoor air is relatively cooler

3

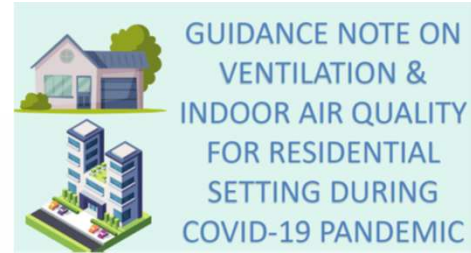
- Small opening in windows is recommended to allow ventilation, provided the opening in windows do not cause excessive infiltration of air

4

- Recommended temperature: 23⁰C – 26⁰C

ADDITIONAL
INFO -
RESIDENTIAL
SETTING

EXTRA MEASURES FOR LOW/ HIGH RISE APARTMENTS



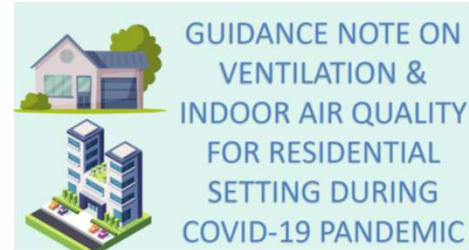
Ensure Water is in the Plumbing Traps - The U-shaped trap in all plumbing drains shall not be allowed to go dry. The easiest action to take is to make sure every sink, shower, bathtub and floor drain is used at least once a day. 30 seconds of flow is sufficient

Maintain pressurization - Use of exhaust fan systems is recommended to keep the home below the pressure of any adjacent common space, such as a corridor

Seal any openings between residence units - Any large openings that might allow air to flow to the residence unit shall be sealed with caulk, foam, plastic or similar materials. Example; plumbing or other utility penetrations

ADDITIONAL
INFO -
RESIDENTIAL
SETTING

**CREATING AN ISOLATION SPACE FOR SICK,
SUSPECTED OR INFECTED HOUSEHOLD MEMBERS**



Select an isolation space that has the least-frequented occupant traffic. The isolation space should have its own bathroom facilities, without sharing with an adjacent room

If need to share bathroom, make sure the room has good air flow by opening windows. If the bathroom in the isolation space has an exhaust fan, it should run continuously.

Exhaust fans in the main part of the home should be operated only on as-needed basis

Air-conditioner in isolation room should not be used. Windows should be opened instead for natural ventilation

Install air barriers between the isolation space and the common space. Seal any openings connecting the isolation space to the rest of the home

VENTILATION

- + Practice physical distancing
- + Wearing masks
- + Frequently washing hand
- + Carrying out regular disinfection
- + Allowable occupancy



DEPARTMENT OF OCCUPATIONAL
SAFETY AND HEALTH

THANK YOU